47th Annual Gaseous Electronics Conference
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Distribution of **Unimolecular** Lifetimes **in Ion-**molecule Association Reactions, A. D. Sen and V. G. Anicich, JPL, Caltech, and M. J. McEwan, U. of Canterbury - The distribution of unimolecular lifetimes of ion-molecule complexes formed in association reactions has been measured by ion cyclotron double-resonance. The mean unimolecular lifetimes of $(H_2C_6N_2^+)^*$ and $(CH_3CN.CH_3^+)^*$ were determined to be 180 μs and 140 μs respectively. A theoretical examination of the distribution of lifetimes of $(CH_3CN.CH_3^+)^*$ was conducted using a RRKM model. The RRKM distribution, when modified by experimental constraints, was found to be a good approximation of the experimentally determined lifetime distribution. The lifetimes for unimolecular dissociation and radiative relaxation, and the absolute efficiency of collisional relaxation are also reported.